OIPE
NOV 10 2003
PATENT & TRADEMARK OFFICE

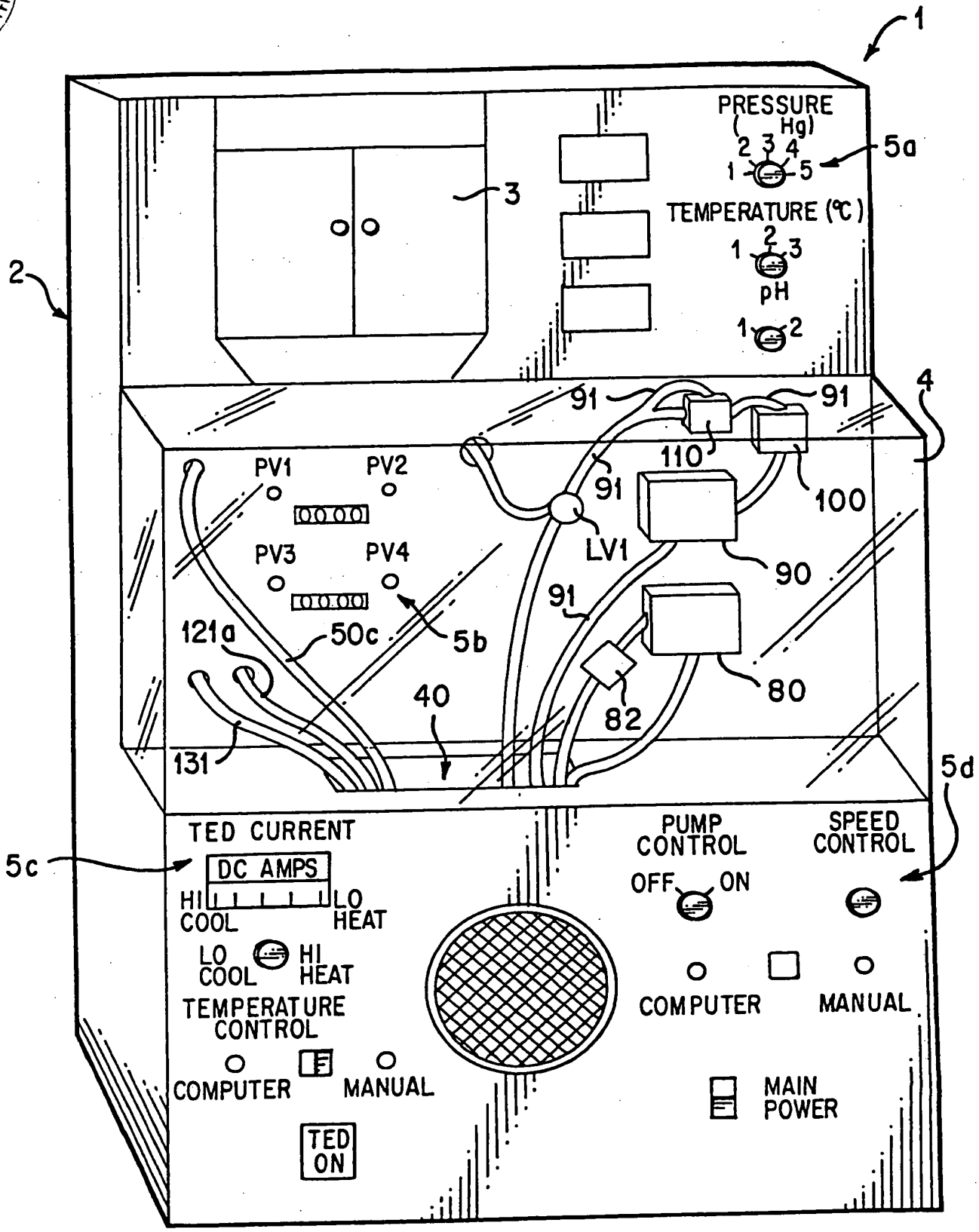


FIG. 1

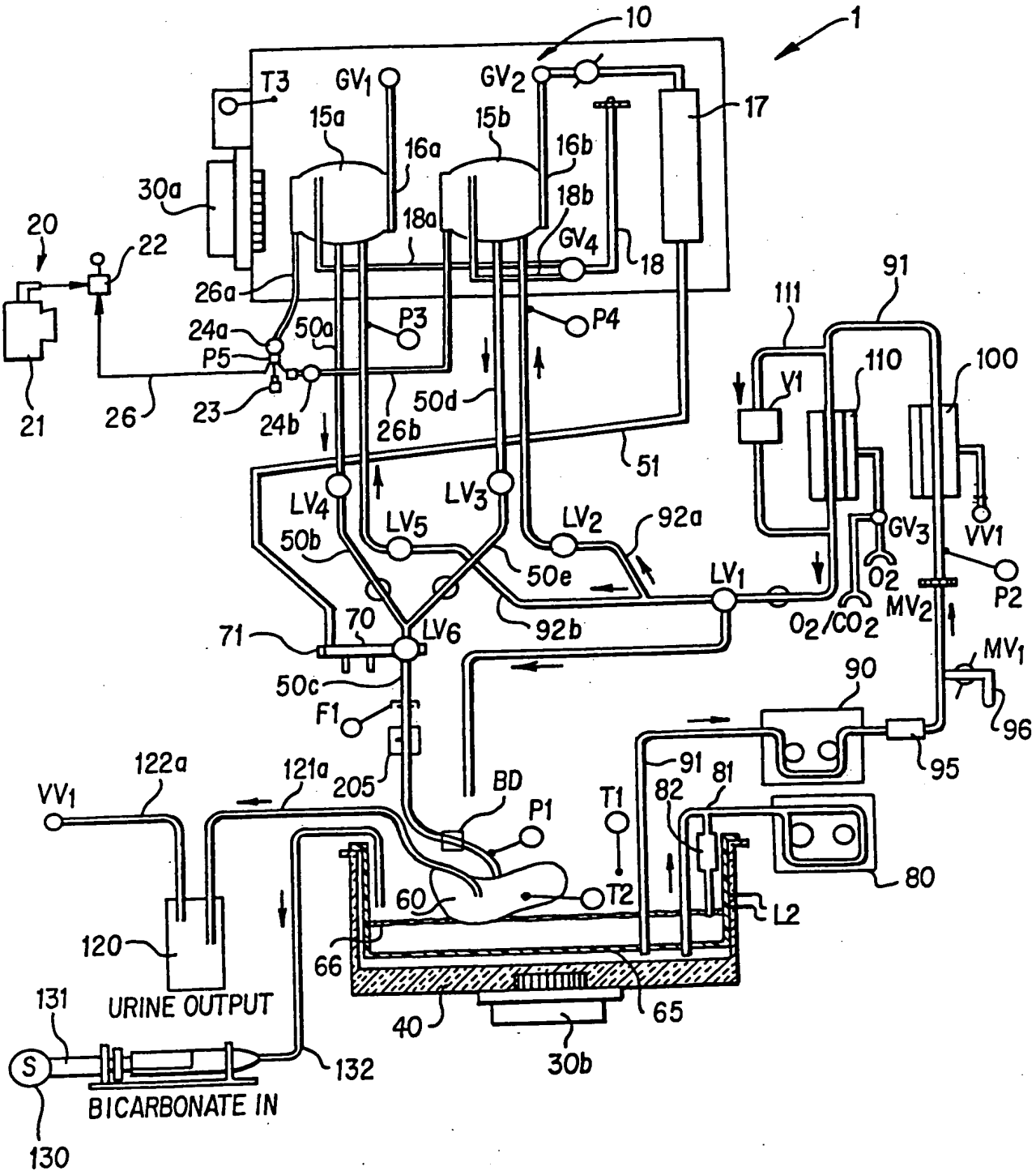

10
1
T3
GV1
GV2
17
15a
15b
16a
16b
18b
30a
18a
GV4
18
20
22
91
111
26a
24a
50a
P3
P4
P5
110
100
V1
21
26
23
24b
26b
50d
51
LV4
LV3
LV5
LV2
92a
50b
GV3
VV1
50e
LV1
O2
P2
MV2
71
70
LV6
92b
O2/CO2
MV1
50c
90
F1
96
122a
121a
205
BD
91
81
95
VV1
P1
T1
82
80
60
T2
L2
120
66
65
131
URINE OUTPUT
40
30b
S
132
BICARBONATE IN
130

FIG. 2

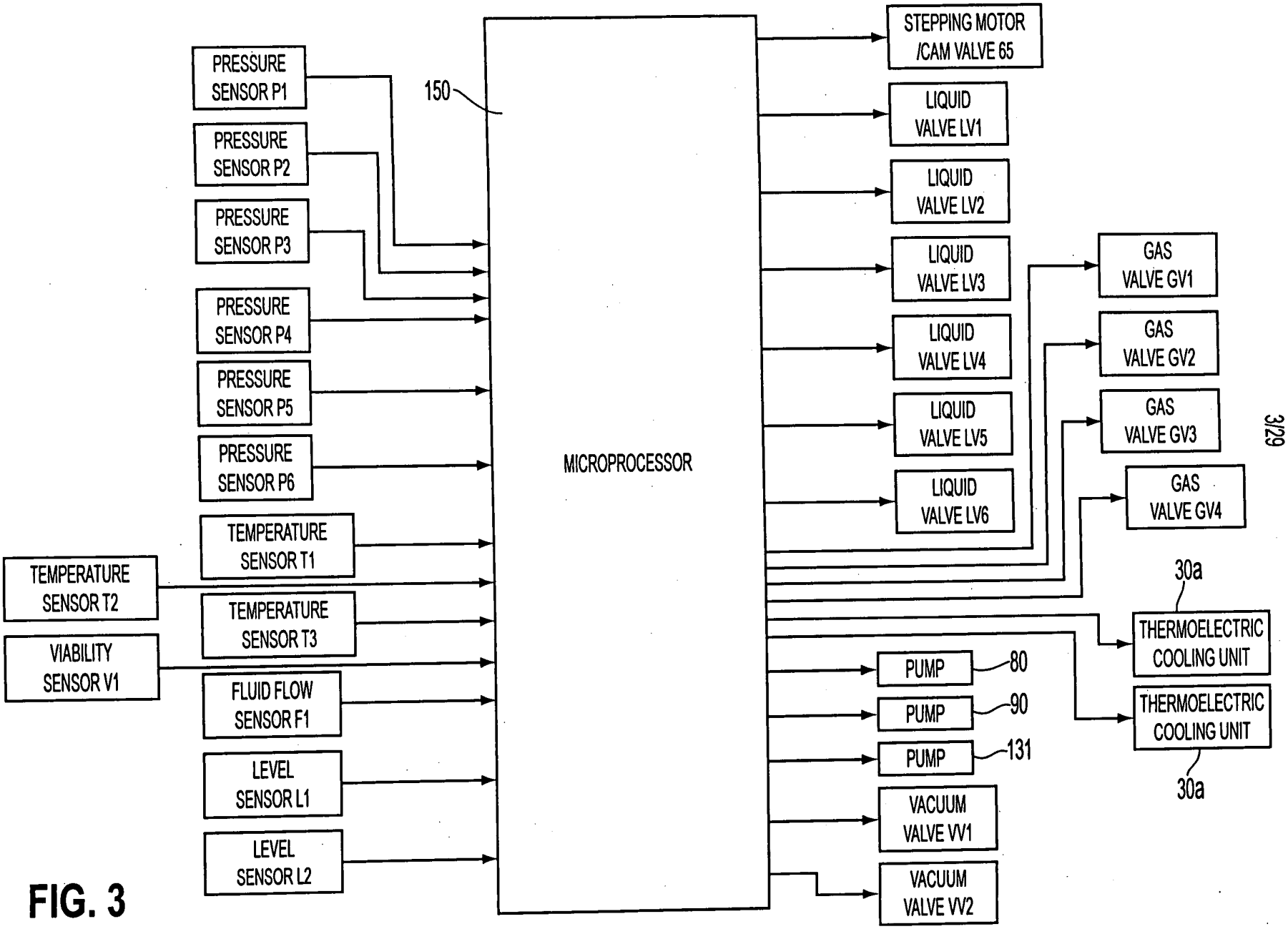

PRESSURE SENSOR P1
PRESSURE SENSOR P2
PRESSURE SENSOR P3
PRESSURE SENSOR P4
PRESSURE SENSOR P5
PRESSURE SENSOR P6
TEMPERATURE SENSOR T1
TEMPERATURE SENSOR T2
TEMPERATURE SENSOR T3
VIABILITY SENSOR V1
FLUID FLOW SENSOR F1
LEVEL SENSOR L1
LEVEL SENSOR L2
150
MICROPROCESSOR
STEPPING MOTOR /CAM VALVE 65
LIQUID VALVE LV1
LIQUID VALVE LV2
LIQUID VALVE LV3
LIQUID VALVE LV4
LIQUID VALVE LV5
LIQUID VALVE LV6
GAS VALVE GV1
GAS VALVE GV2
GAS VALVE GV3
GAS VALVE GV4
30a
THERMOELECTRIC COOLING UNIT
THERMOELECTRIC COOLING UNIT
30a
PUMP
80
PUMP
90
PUMP
131
VACUUM VALVE VV1
VACUUM VALVE VV2

FIG. 3

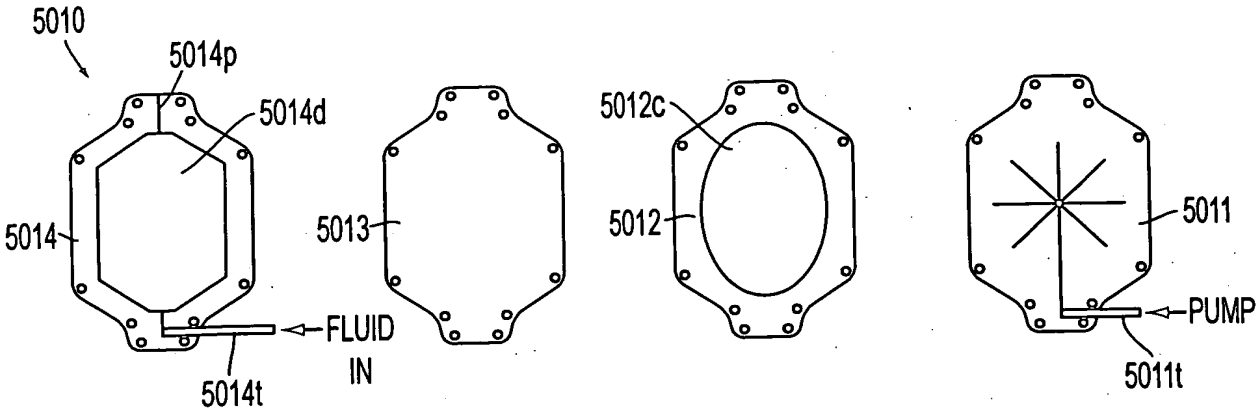

5010
5014p
5014d
5014
5013
5012c
5012
5011
FLUID IN
PUMP
5014t
5011t

FIG. 4

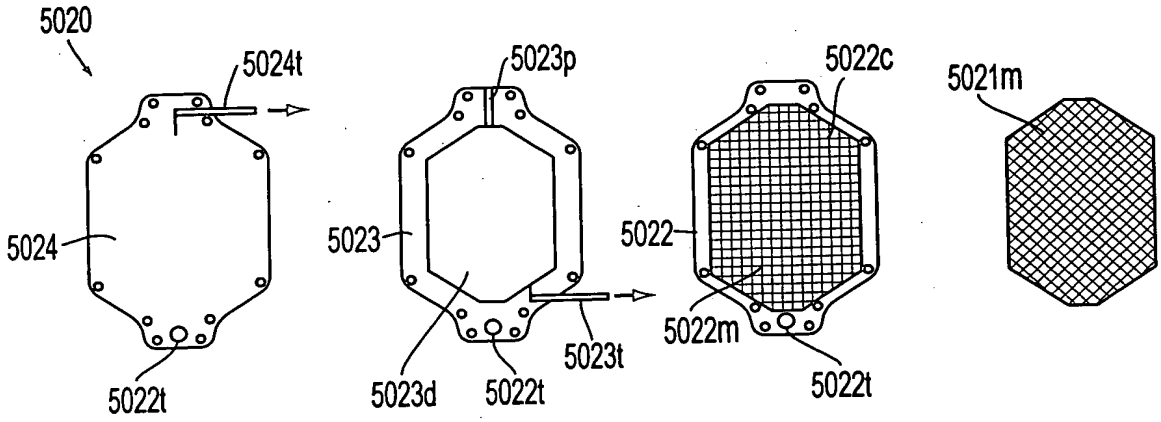

5020
5024t
5023p
5022c
5021m
5024
5023
5022
5022m
5023t
5022t
5023d
5022t

FIG. 5

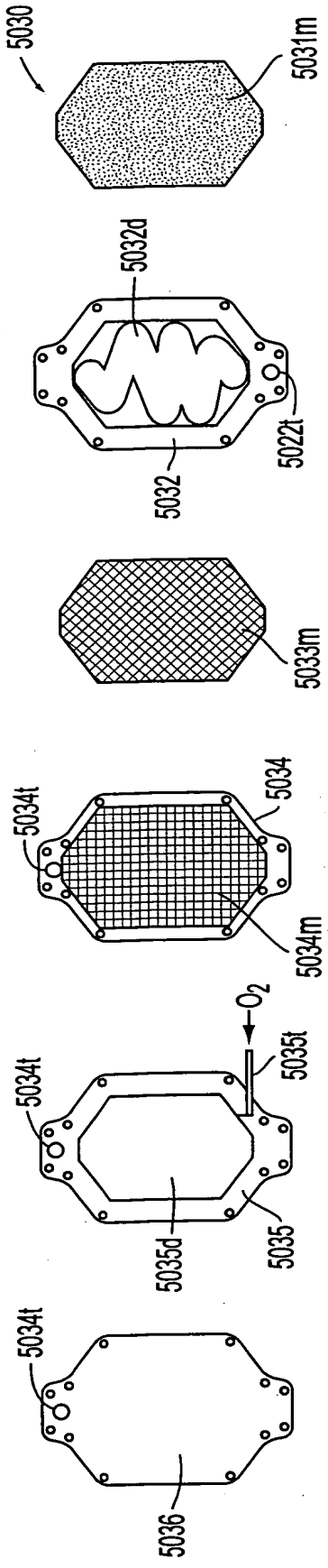

5030
5031m
5032d
5022t
5032
5033m
5034t
5034
5034m
O_2
5035t
5034t
5035d
5035
5034t
5036

FIG. 6

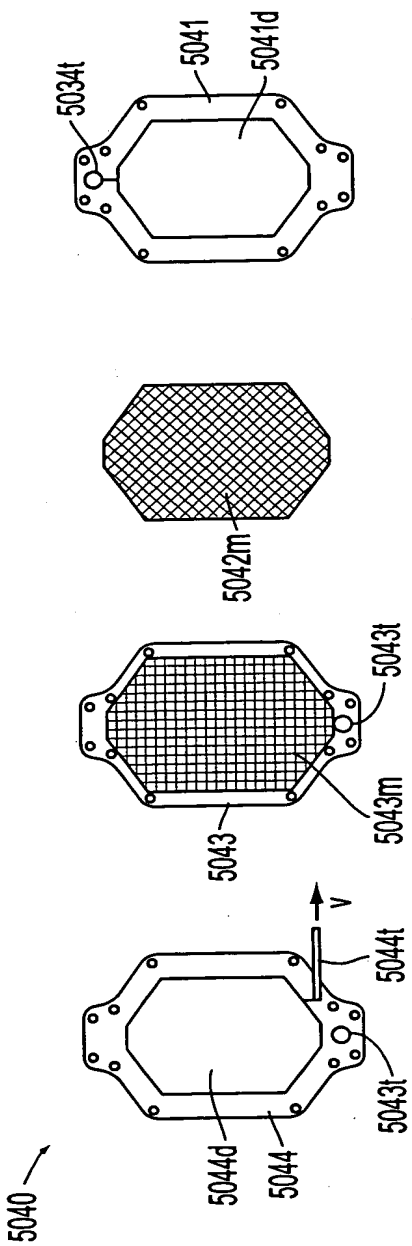

5034t
5041
5041d
5042m
5043t
5043
5043m
V
5044t
5043t
5044d
5044
5040

FIG. 7

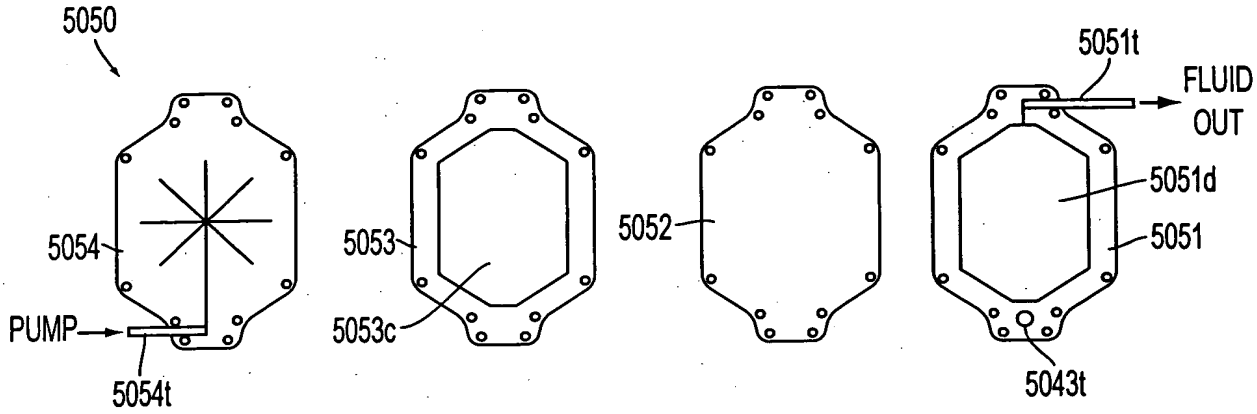

5050
5054
PUMP
5054t
5053
5053c
5052
5051t
FLUID
OUT
5051d
5051
5043t

FIG. 8

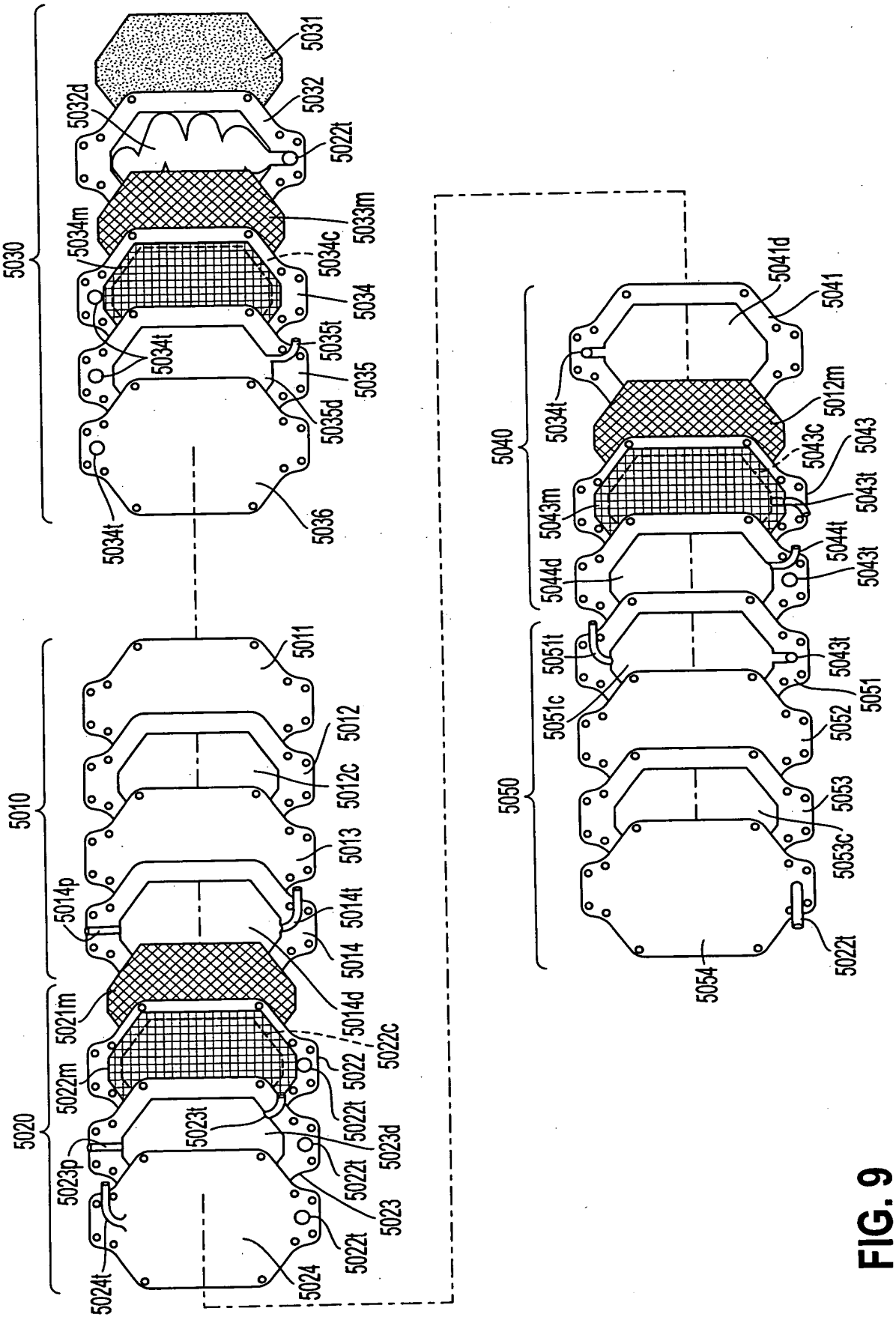

5030
5031
5032
5032d
5022t
5033m
5034m
5034c
5034
5035t
5035
5035d
5034t
5036
5010
5011
5012
5012c
5013
5014p
5014t
5014
5014d
5020
5021m
5022m
5022
5022c
5023t
5022t
5023p
5023d
5023
5024t
5024
5040
5041d
5041
5034t
5012m
5043c
5043
5043m
5043t
5044t
5044d
5050
5051t
5051c
5052
5053
5053c
5054

FIG. 9

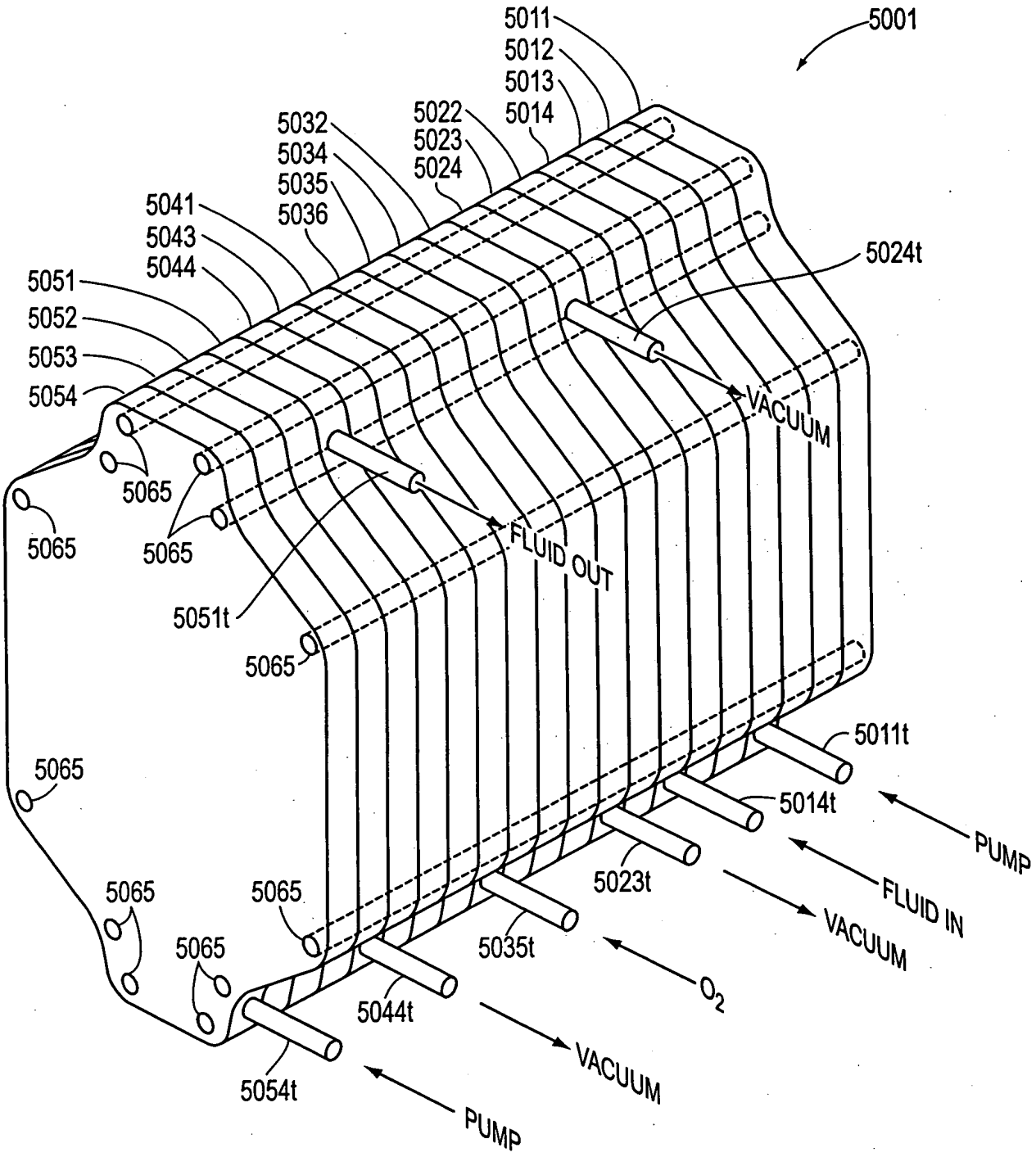

5001
5011
5012
5013
5014
5022
5023
5024
5024t
5032
5034
5035
5036
5041
5043
5044
5051
5052
5053
5054
5065
5051t
5011t
5014t
5023t
5035t
5044t
5054t
VACUUM
FLUID OUT
FLUID IN
PUMP
O_2

FIG. 10

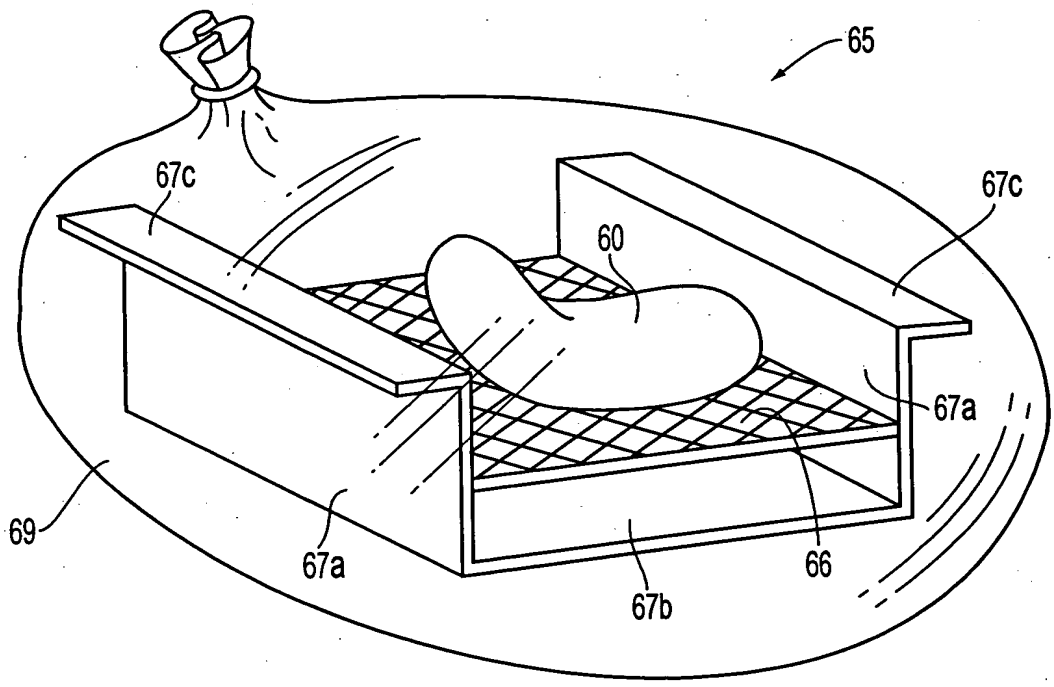


FIG. 11A

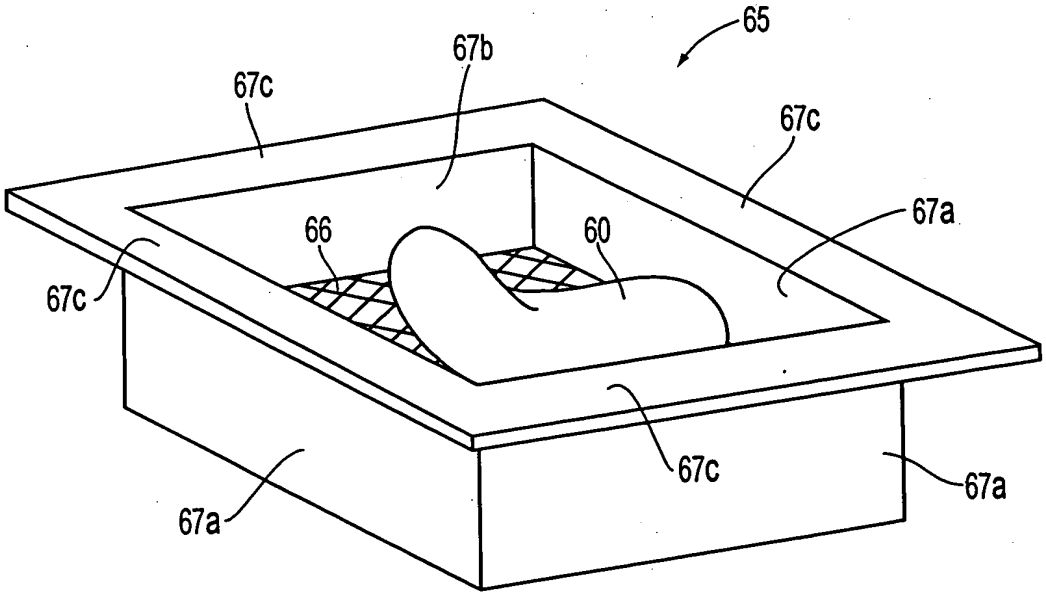


FIG. 11B

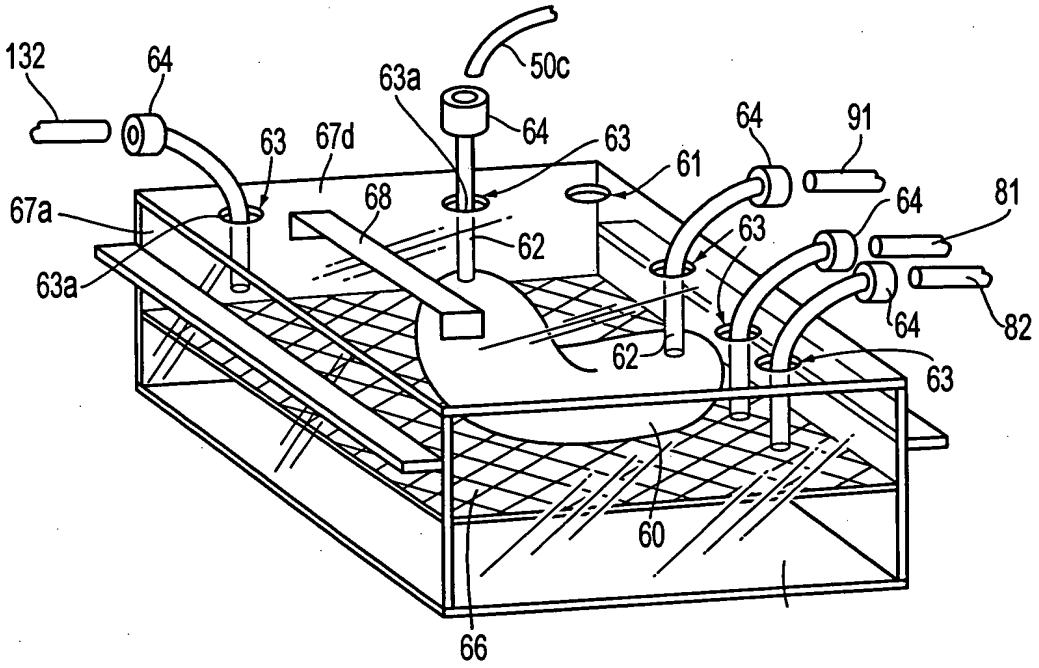


FIG. 11D

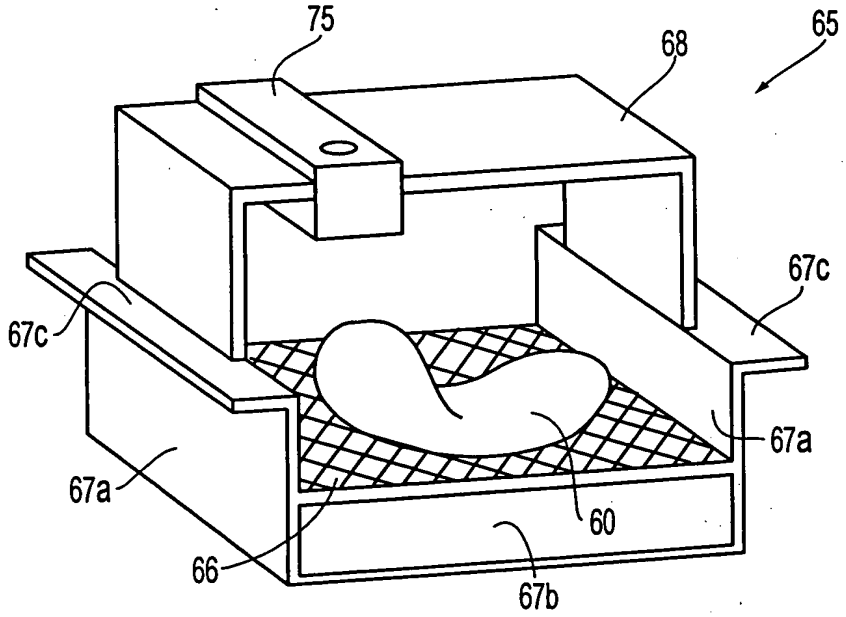


FIG. 11C

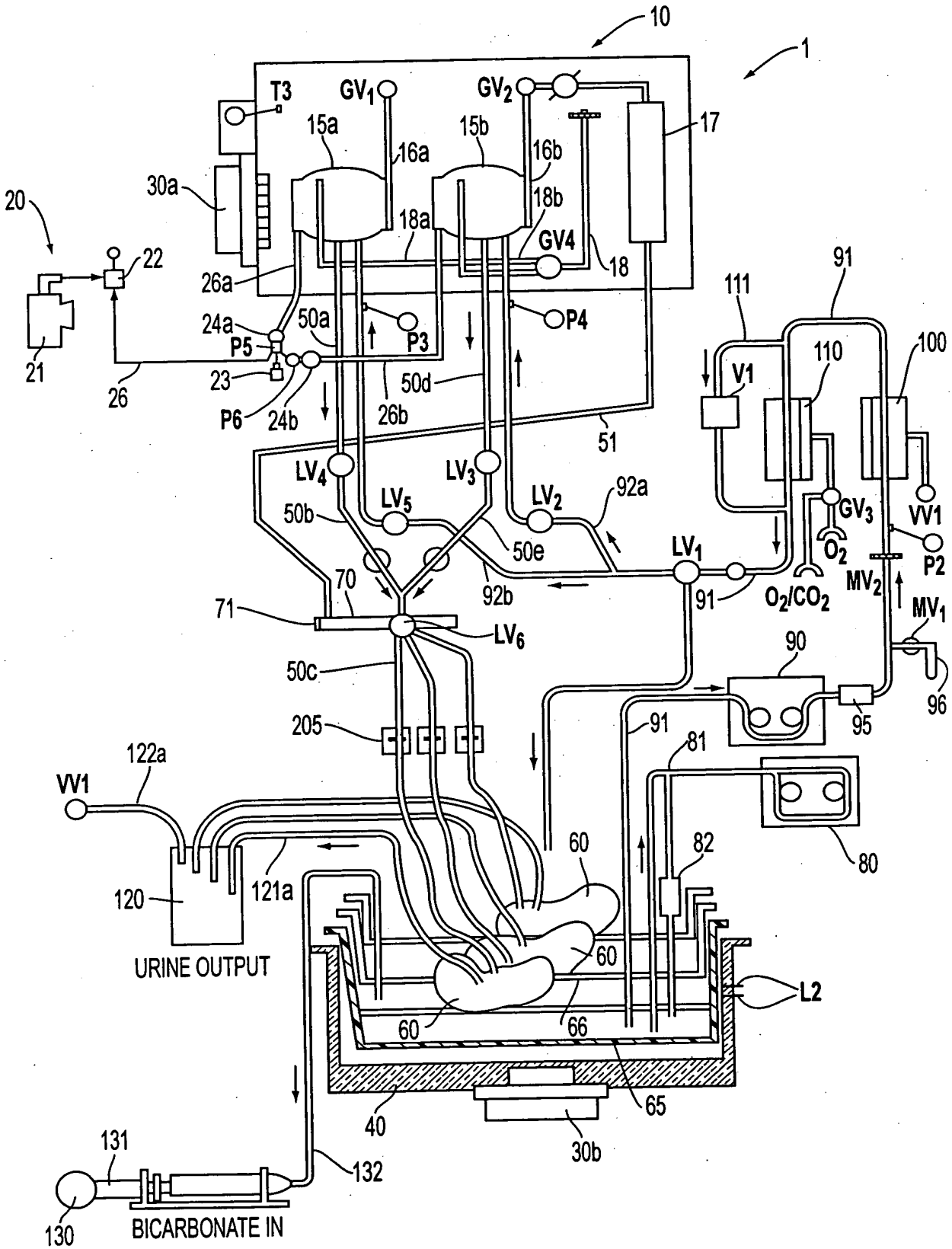

10
1
T3
GV1
GV2
15a
16a
15b
16b
17
30a
18a
18b
GV4
18
20
22
26a
91
111
24a
50a
P5
P3
P4
100
110
V1
21
23
50d
26
P6
24b
26b
51
LV4
LV3
LV2
92a
LV5
50b
GV3
VV1
50e
LV1
O2
P2
70
92b
91
O2/CO2
MV2
MV1
71
LV6
90
50c
96
205
95
91
81
122a
VV1
80
60
82
120
121a
URINE OUTPUT
60
L2
60
66
65
40
30b
131
132
130
BICARBONATE IN

FIG. 12

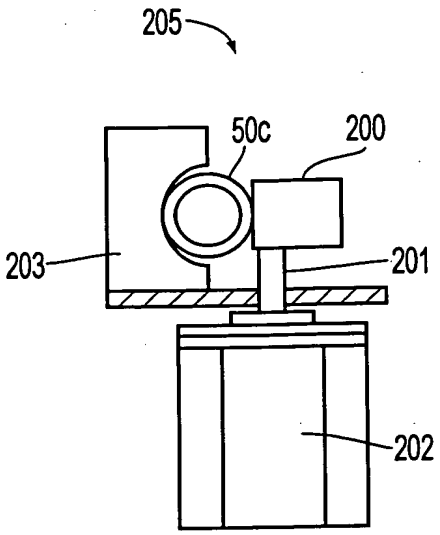


FIG. 13A

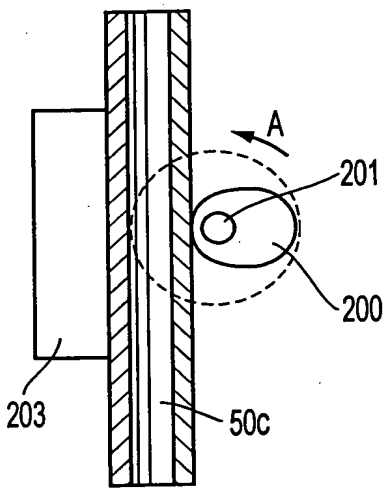


FIG. 13B

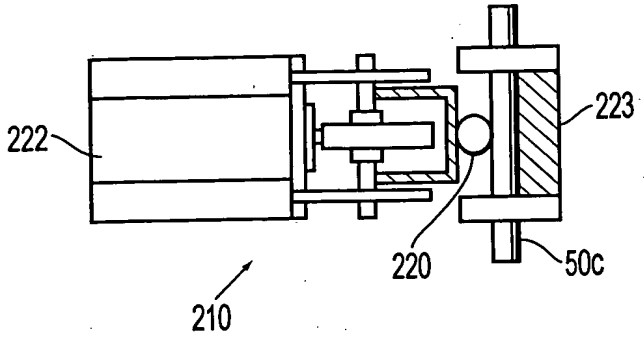


FIG. 14A

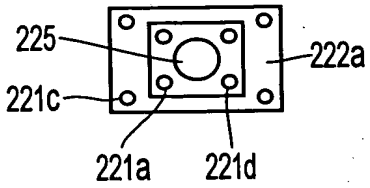


FIG. 14B

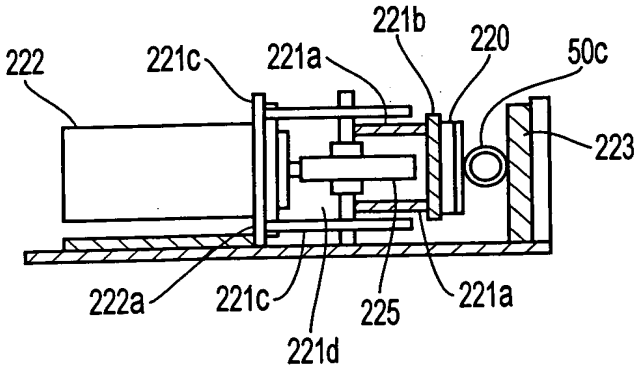


FIG. 14C

FIG. 14D

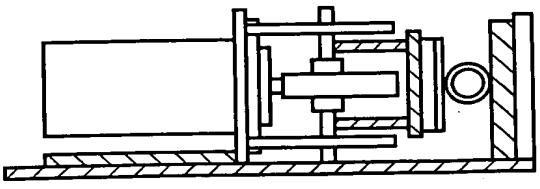


FIG. 14E

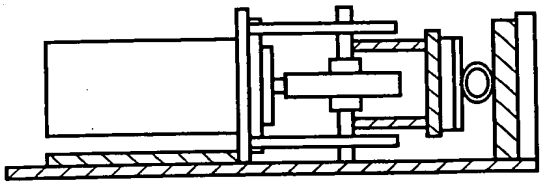
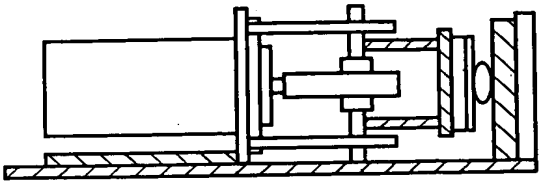


FIG. 14F



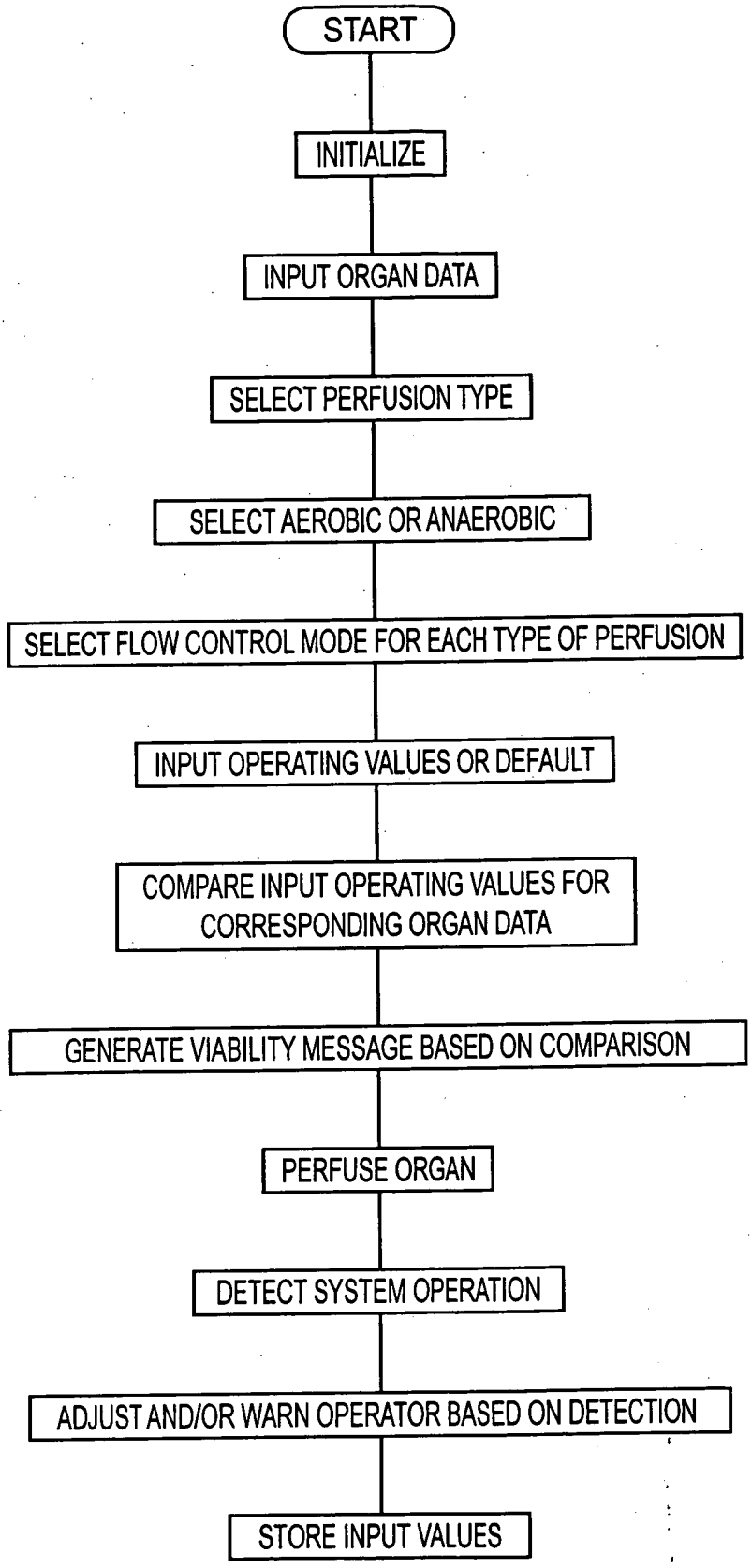

START
INITIALIZE
INPUT ORGAN DATA
SELECT PERFUSION TYPE
SELECT AEROBIC OR ANAEROBIC
SELECT FLOW CONTROL MODE FOR EACH TYPE OF PERFUSION
INPUT OPERATING VALUES OR DEFAULT
COMPARE INPUT OPERATING VALUES FOR CORRESPONDING ORGAN DATA
GENERATE VIABILITY MESSAGE BASED ON COMPARISON
PERFUSE ORGAN
DETECT SYSTEM OPERATION
ADJUST AND/OR WARN OPERATOR BASED ON DETECTION
STORE INPUT VALUES

FIG. 15

HYPOTHERMIC MOR ORGAN RECOVERY

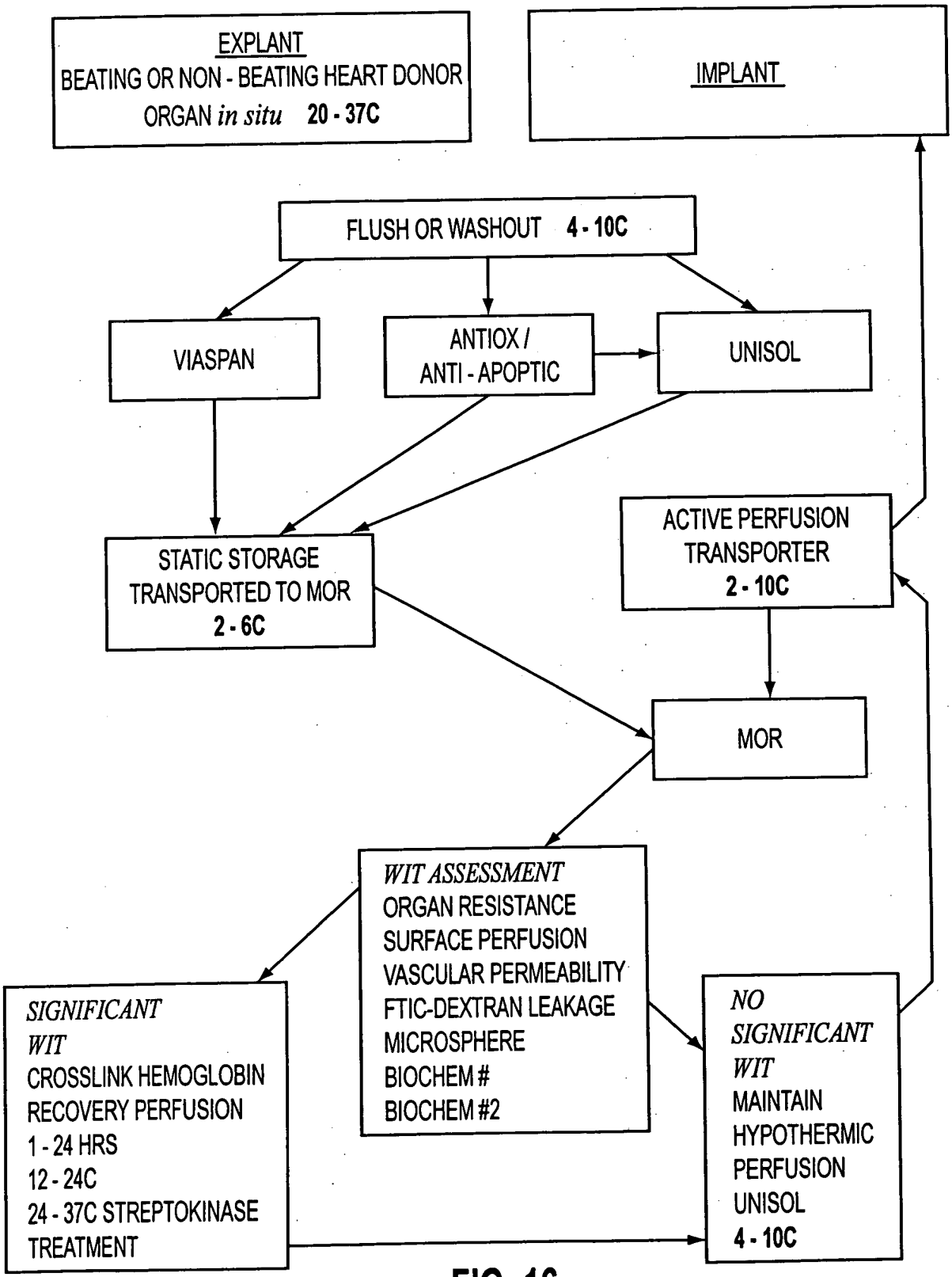


FIG. 16

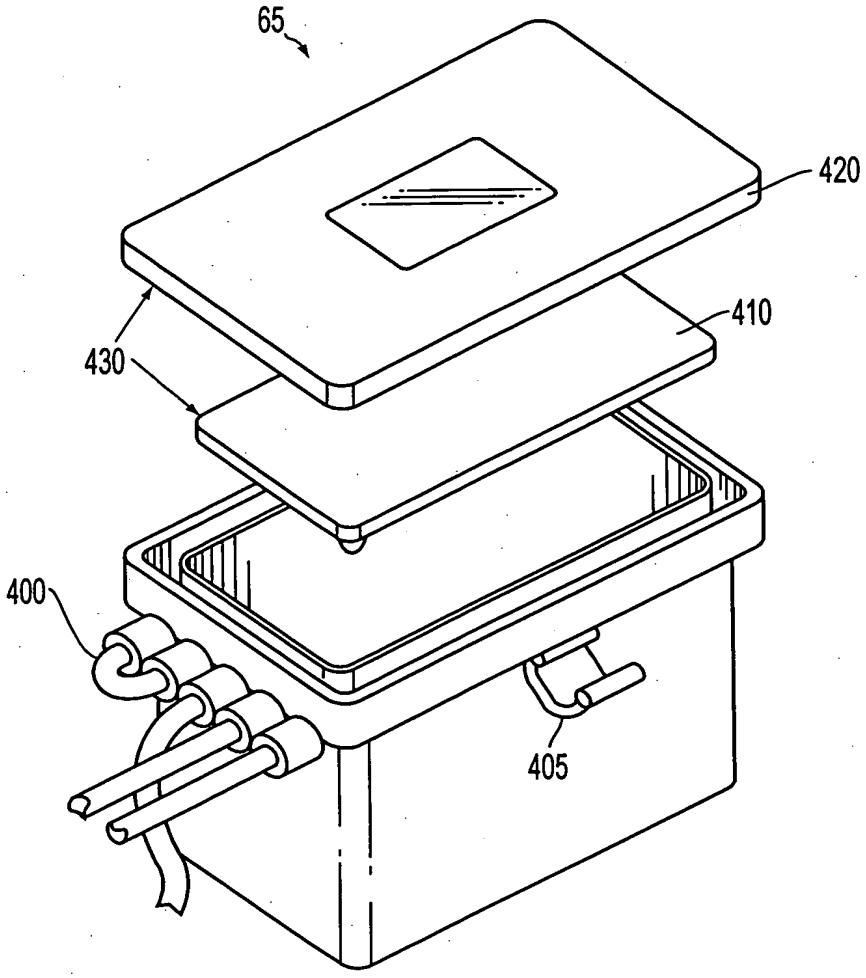


FIG. 17

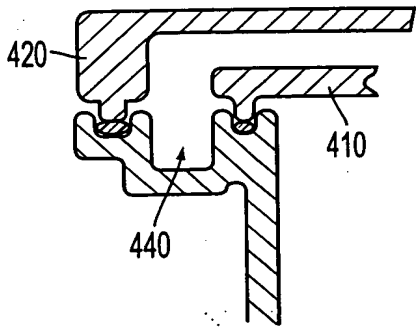


FIG. 17A

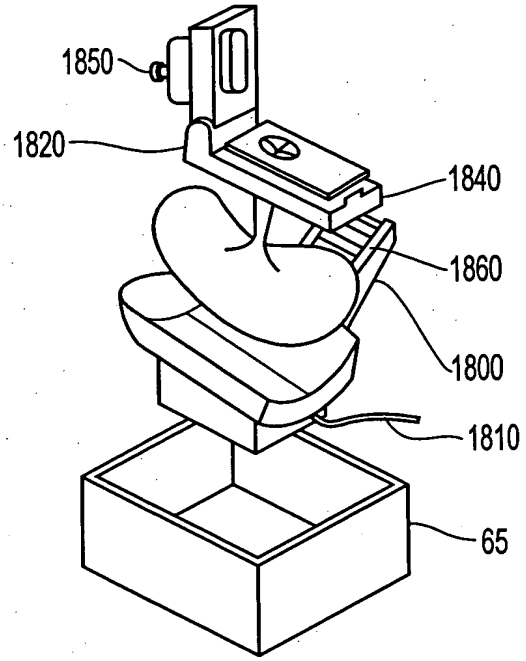


FIG. 18

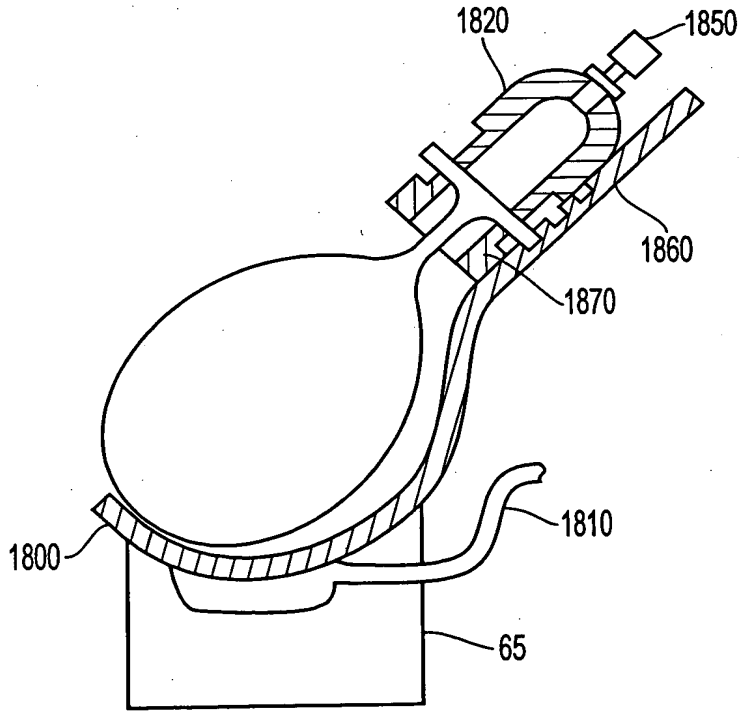


FIG. 18A

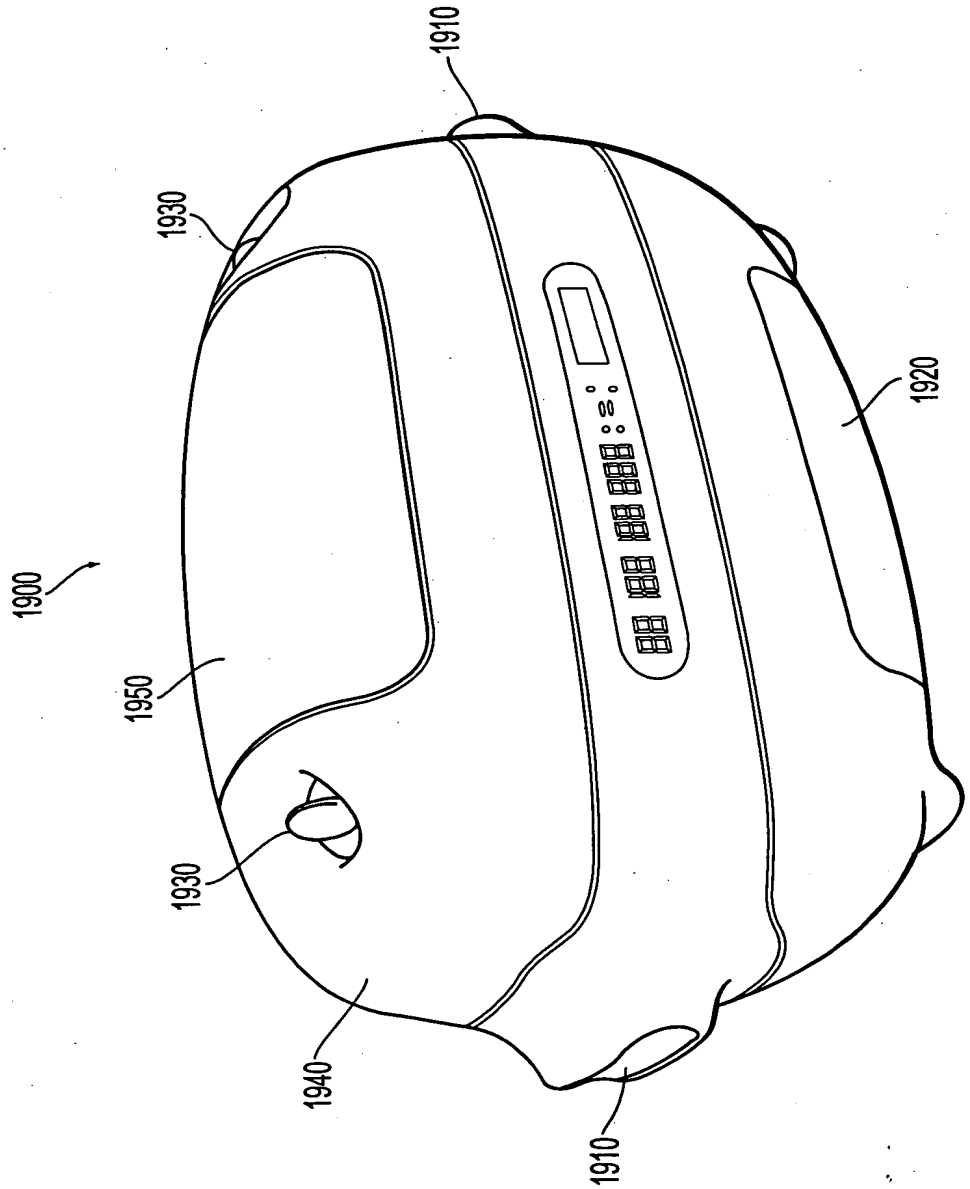


FIG. 19

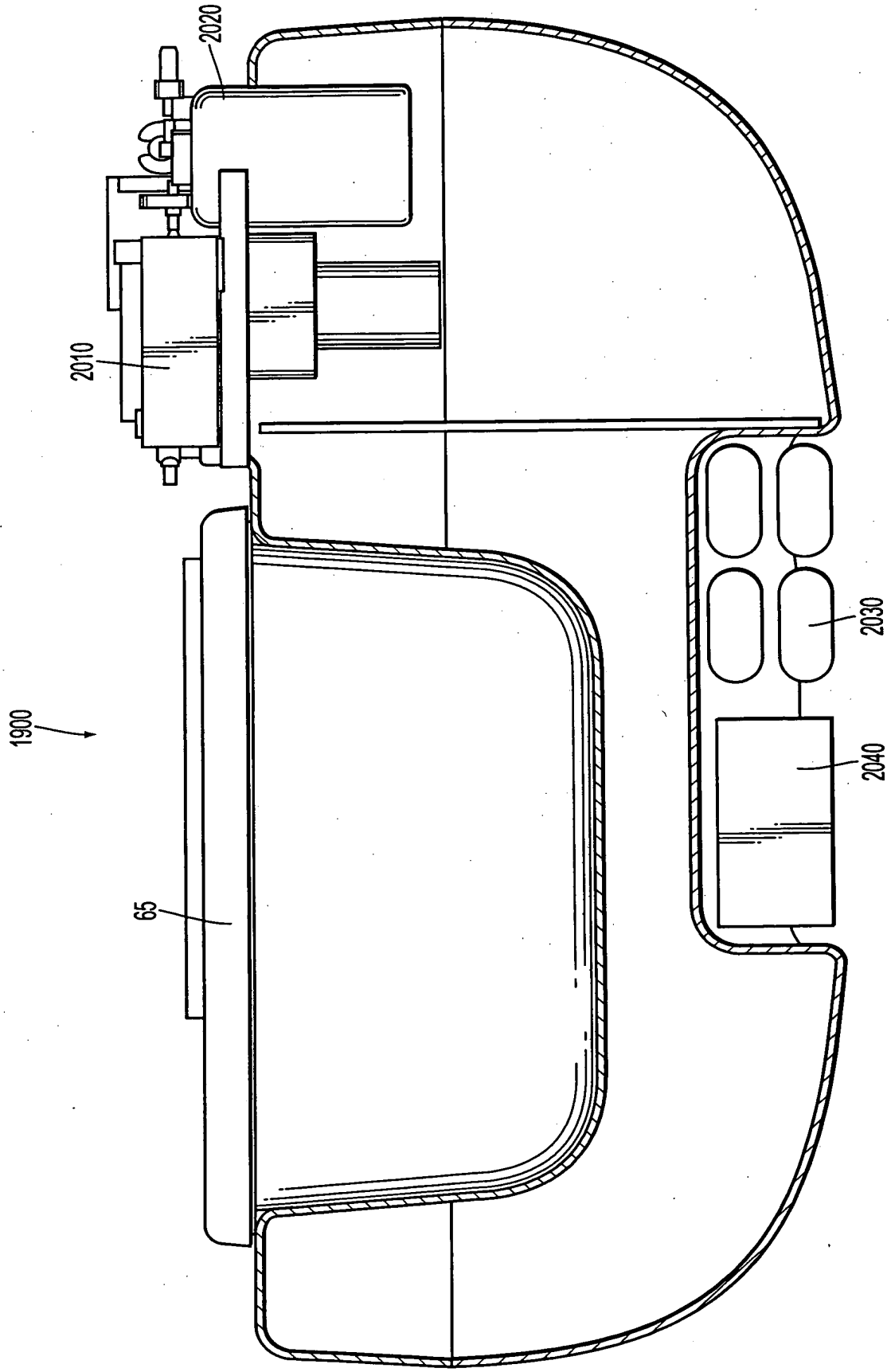


FIG. 20

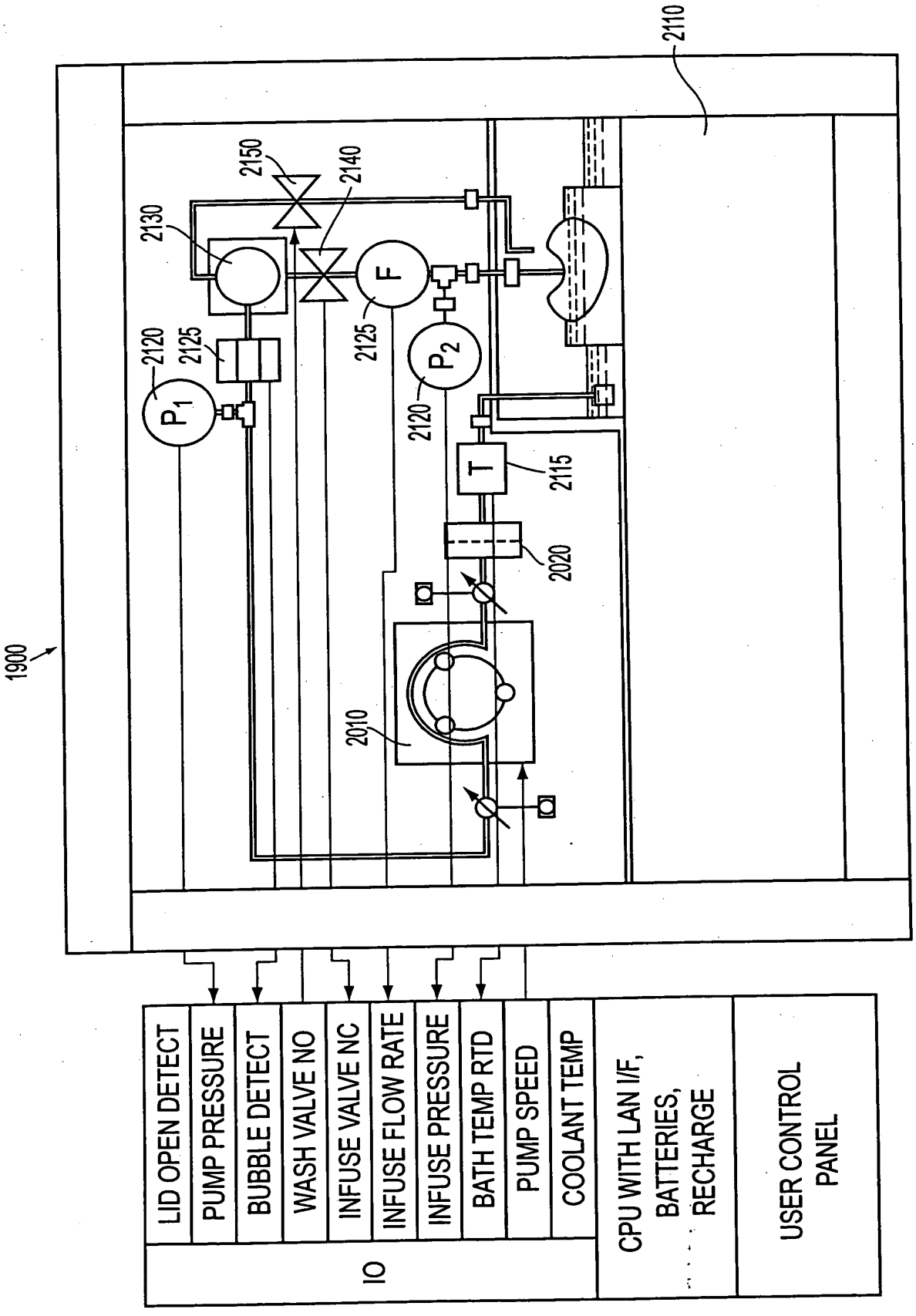

1900
2110
2150
2140
2130
2120
2125
P_1
2125
F
P_2
2120
T
2115
2020
2010
LID OPEN DETECT
PUMP PRESSURE
BUBBLE DETECT
WASH VALVE NO
INFUSE VALVE NC
INFUSE FLOW RATE
INFUSE PRESSURE
BATH TEMP RTD
PUMP SPEED
COOLANT TEMP
IO
CPU WITH LAN I/F, BATTERIES, RECHARGE
USER CONTROL PANEL

FIG. 21

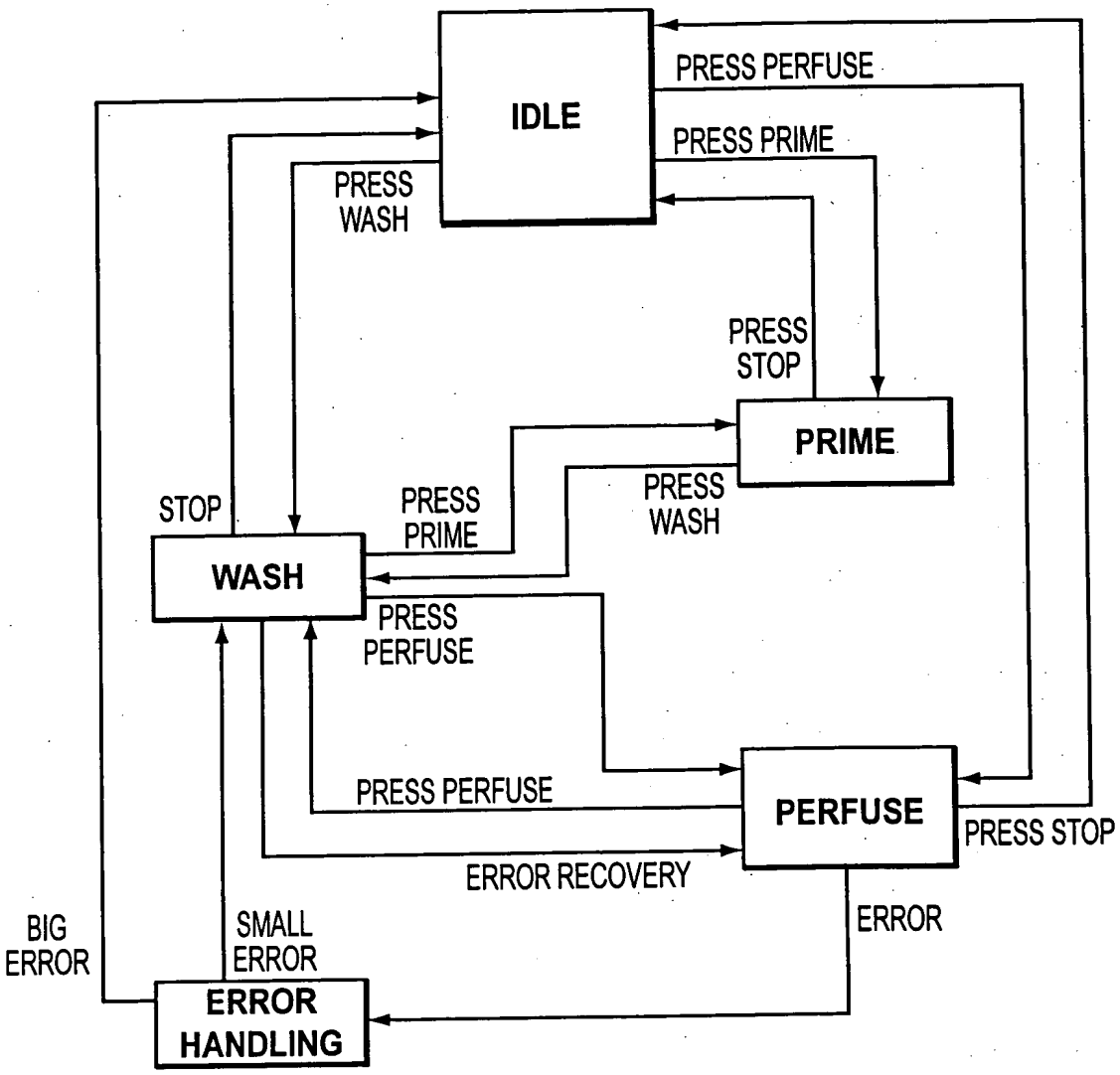

IDLE
PRESS PERFUSE
PRESS PRIME
PRESS WASH
PRESS STOP
PRIME
PRESS WASH
STOP
PRESS PRIME
WASH
PRESS PERFUSE
PRESS PERFUSE
PERFUSE
PRESS STOP
ERROR RECOVERY
ERROR
BIG ERROR
SMALL ERROR
ERROR HANDLING

FIG. 22

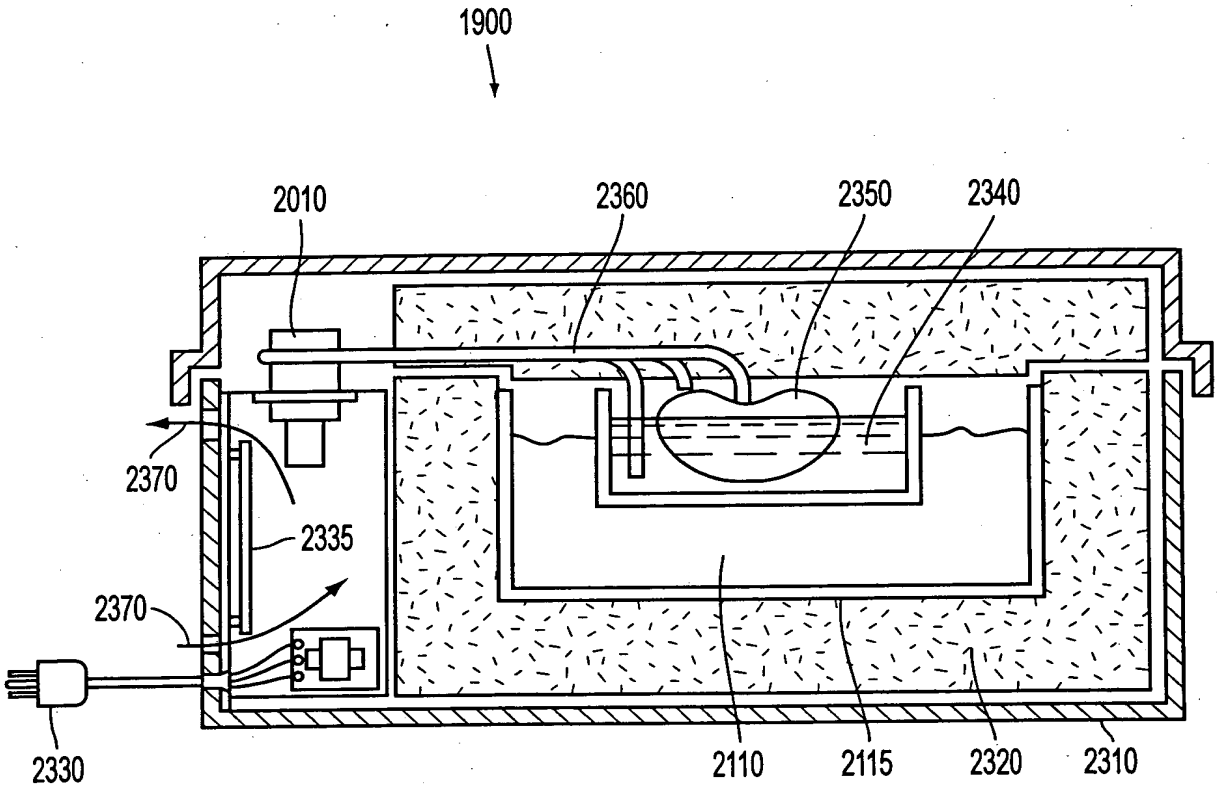

1900
2010
2360
2350
2340
2370
2335
2370
2330
2110
2115
2320
2310

FIG. 23

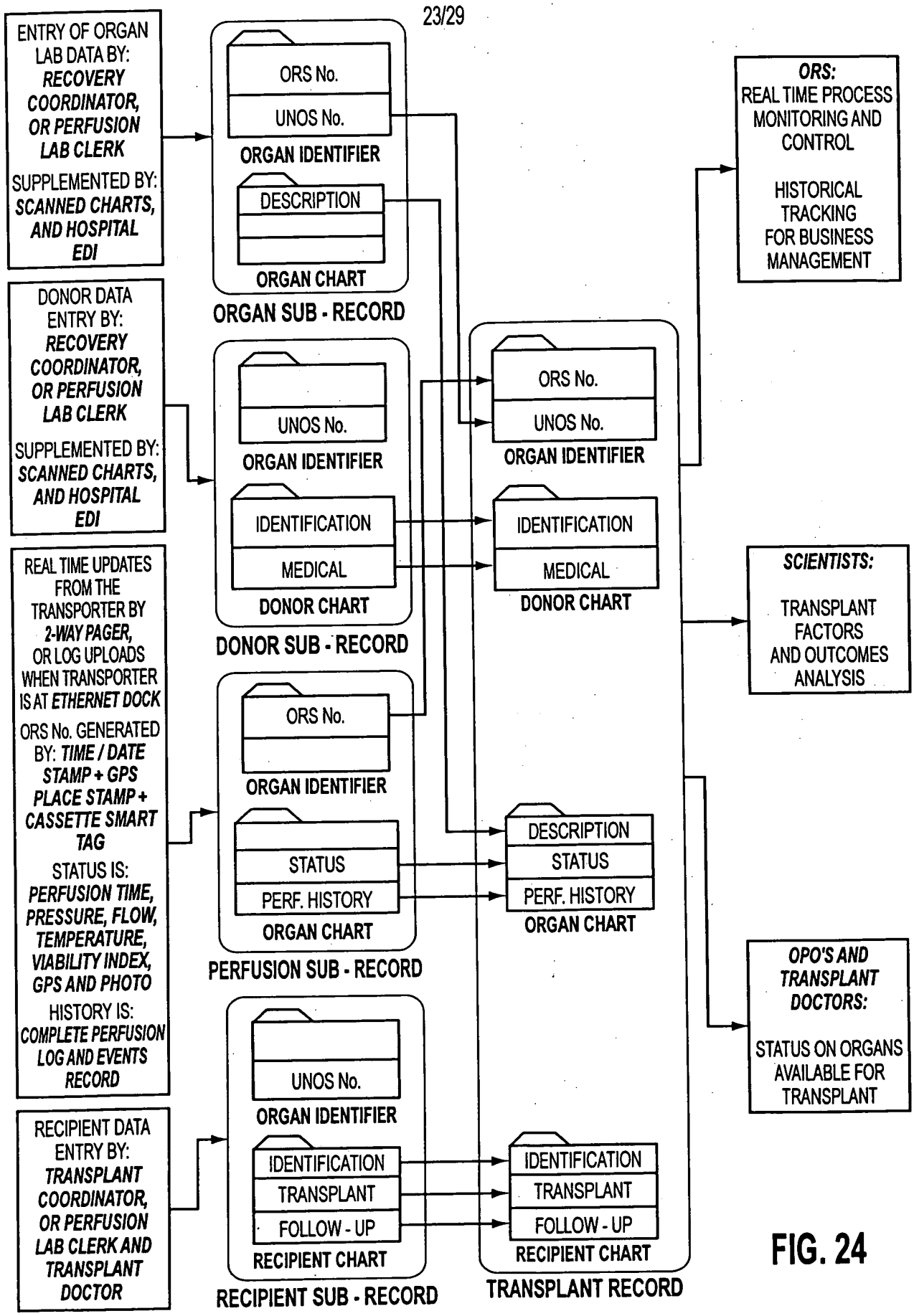

ENTRY OF ORGAN LAB DATA BY: RECOVERY COORDINATOR, OR PERFUSION LAB CLERK
SUPPLEMENTED BY: SCANNED CHARTS, AND HOSPITAL EDI
ORS No.
UNOS No.
ORGAN IDENTIFIER
DESCRIPTION
ORGAN CHART
ORGAN SUB - RECORD
ORS: REAL TIME PROCESS MONITORING AND CONTROL
HISTORICAL TRACKING FOR BUSINESS MANAGEMENT
DONOR DATA ENTRY BY: RECOVERY COORDINATOR, OR PERFUSION LAB CLERK
SUPPLEMENTED BY: SCANNED CHARTS, AND HOSPITAL EDI
UNOS No.
ORGAN IDENTIFIER
IDENTIFICATION
MEDICAL
DONOR CHART
DONOR SUB - RECORD
ORS No.
UNOS No.
ORGAN IDENTIFIER
IDENTIFICATION
MEDICAL
DONOR CHART
SCIENTISTS: TRANSPLANT FACTORS AND OUTCOMES ANALYSIS
REAL TIME UPDATES FROM THE TRANSPORTER BY 2-WAY PAGER, OR LOG UPLOADS WHEN TRANSPORTER IS AT ETHERNET DOCK
ORS No. GENERATED BY: TIME / DATE STAMP + GPS PLACE STAMP + CASSETTE SMART TAG
STATUS IS: PERFUSION TIME, PRESSURE, FLOW, TEMPERATURE, VIABILITY INDEX, GPS AND PHOTO
HISTORY IS: COMPLETE PERFUSION LOG AND EVENTS RECORD
ORS No.
ORGAN IDENTIFIER
STATUS
PERF. HISTORY
ORGAN CHART
PERFUSION SUB - RECORD
DESCRIPTION
STATUS
PERF. HISTORY
ORGAN CHART
OPO'S AND TRANSPLANT DOCTORS: STATUS ON ORGANS AVAILABLE FOR TRANSPLANT
RECIPIENT DATA ENTRY BY: TRANSPLANT COORDINATOR, OR PERFUSION LAB CLERK AND TRANSPLANT DOCTOR
UNOS No.
ORGAN IDENTIFIER
IDENTIFICATION
TRANSPLANT
FOLLOW - UP
RECIPIENT CHART
RECIPIENT SUB - RECORD
IDENTIFICATION
TRANSPLANT
FOLLOW - UP
RECIPIENT CHART
TRANSPLANT RECORD

FIG. 24

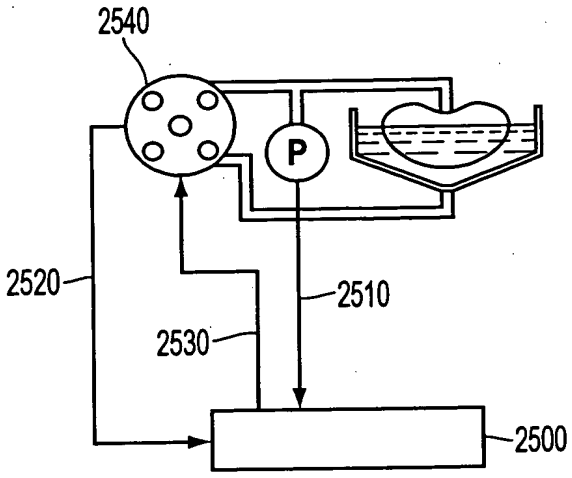


FIG. 25

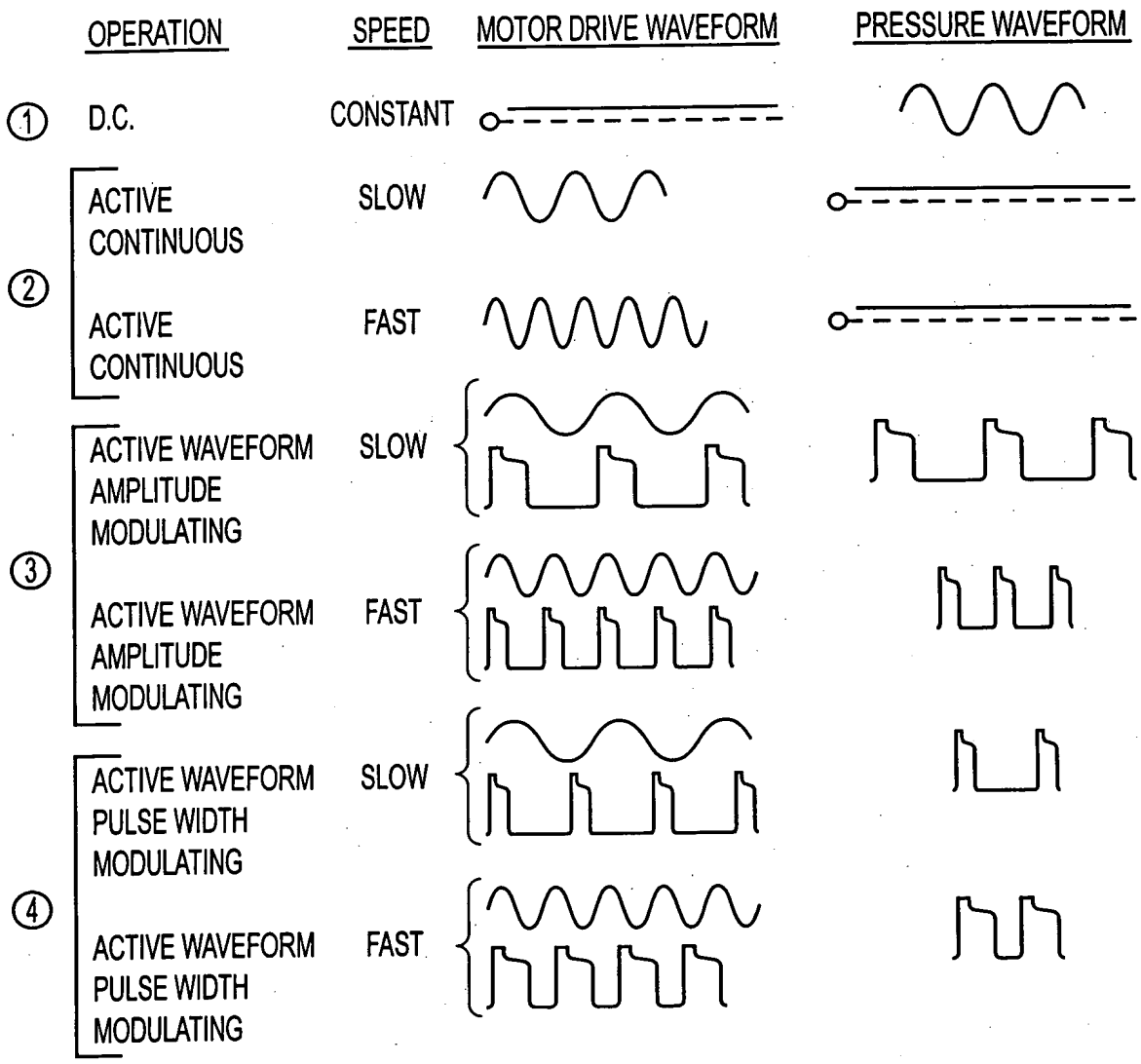

OPERATION
SPEED
MOTOR DRIVE WAVEFORM
PRESSURE WAVEFORM
1
D.C.
CONSTANT
2
ACTIVE CONTINUOUS
SLOW
ACTIVE CONTINUOUS
FAST
3
ACTIVE WAVEFORM AMPLITUDE MODULATING
SLOW
ACTIVE WAVEFORM AMPLITUDE MODULATING
FAST
4
ACTIVE WAVEFORM PULSE WIDTH MODULATING
SLOW
ACTIVE WAVEFORM PULSE WIDTH MODULATING
FAST

FIG. 25A

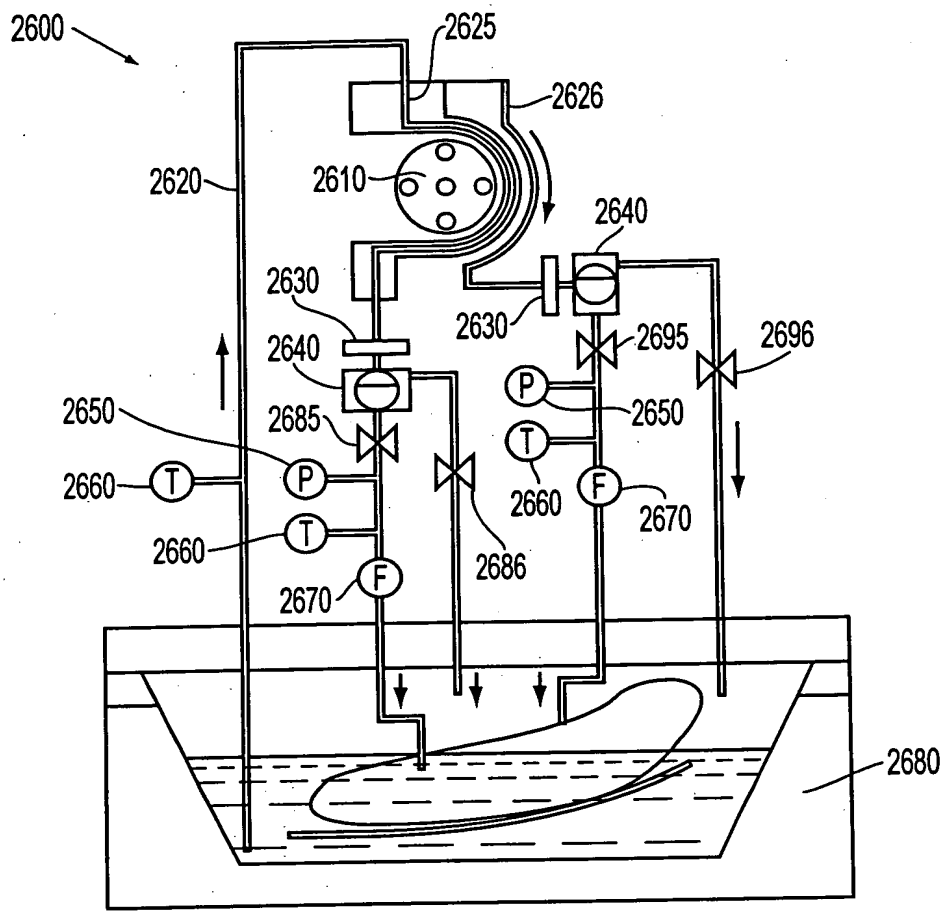

2600
2625
2626
2620
2610
2640
2630
2630
2640
2695
2696
2650
2685
P
2650
T
2660
P
2660
F
2670
T
2660
2686
T
2670
F
2680

FIG. 26

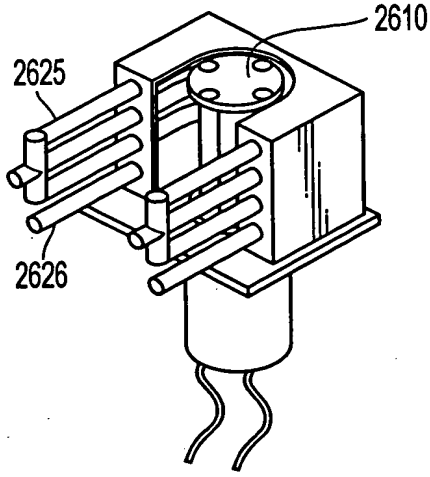

2610
2625
2626

FIG. 27

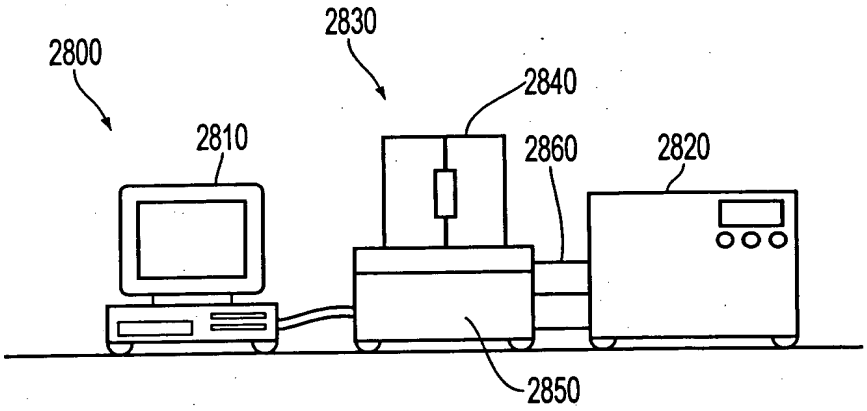

2800
2830
2840
2810
2860
2820
2850

FIG. 28

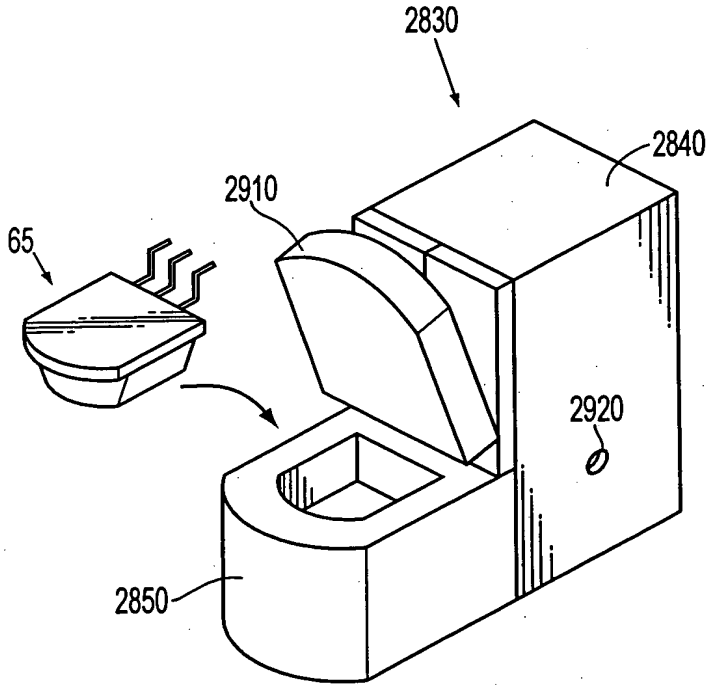

2830
2840
2910
65
2920
2850

FIG. 29

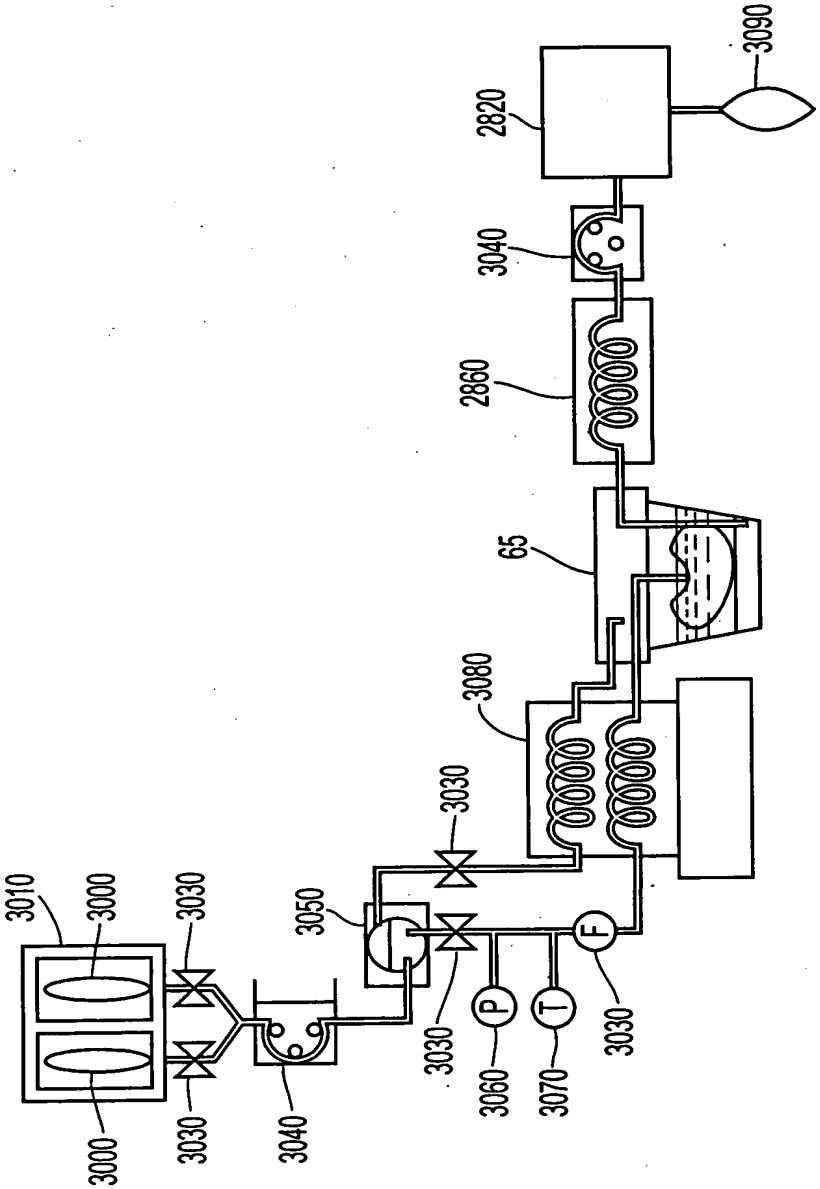

3090
2820
3040
2860
65
3080
3030
3050
3010
3000
3030
3030
3040
3000
3030
3060
3070
3030
P
T
F

FIG. 30

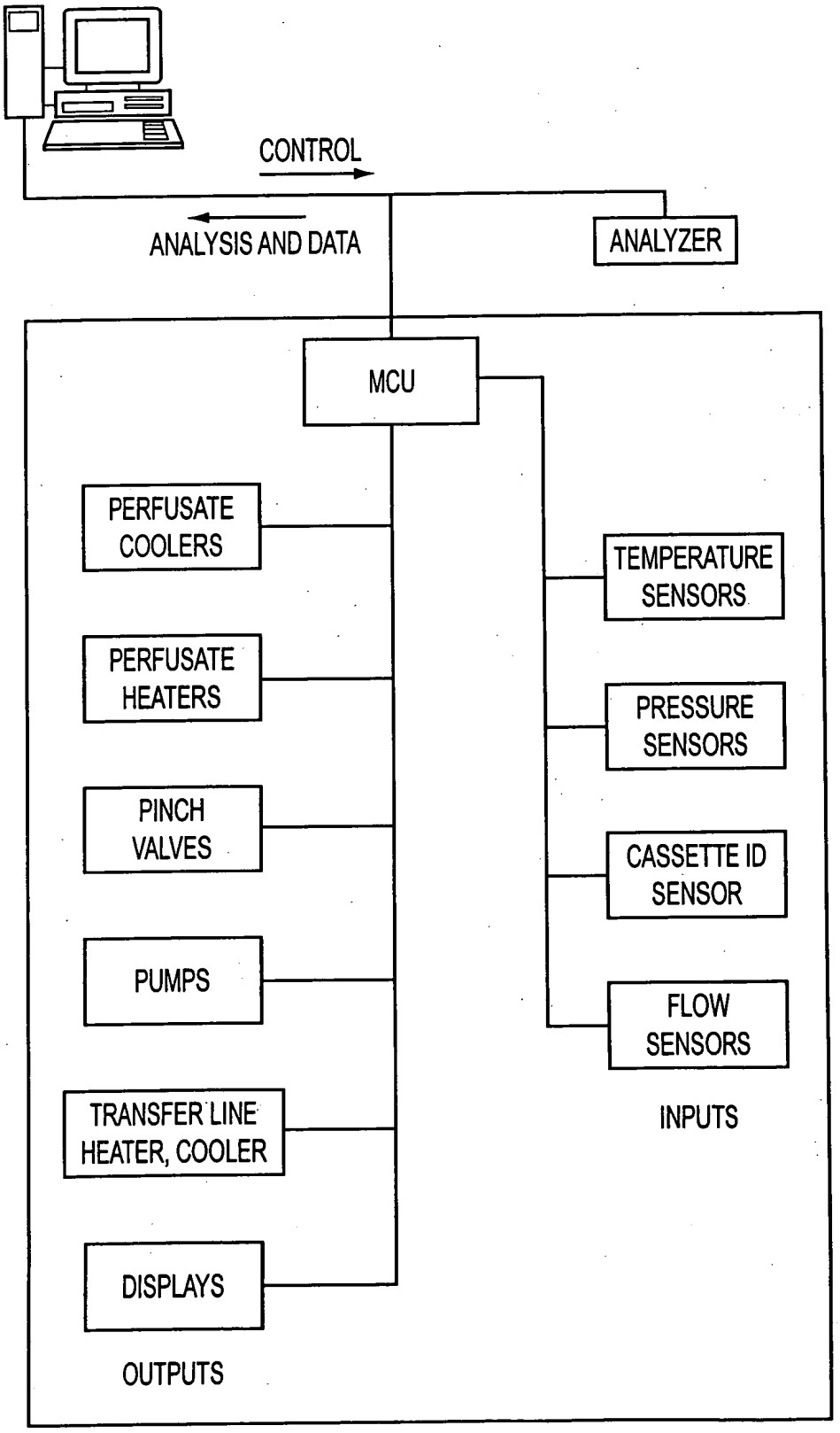

CONTROL
ANALYSIS AND DATA
ANALYZER
MCU
PERFUSATE COOLERS
PERFUSATE HEATERS
PINCH VALVES
PUMPS
TRANSFER LINE HEATER, COOLER
DISPLAYS
OUTPUTS
TEMPERATURE SENSORS
PRESSURE SENSORS
CASSETTE ID SENSOR
FLOW SENSORS
INPUTS

FIG. 31